

Large-Scale Molded Silicon Oxycarbide Composite Components for Ultra-Low-Cost Lightweight Mirrors, Phase II

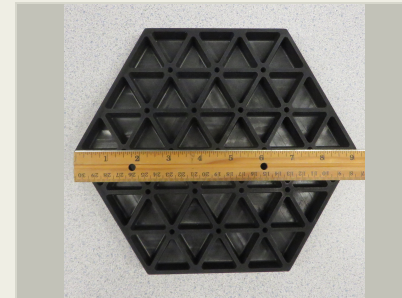
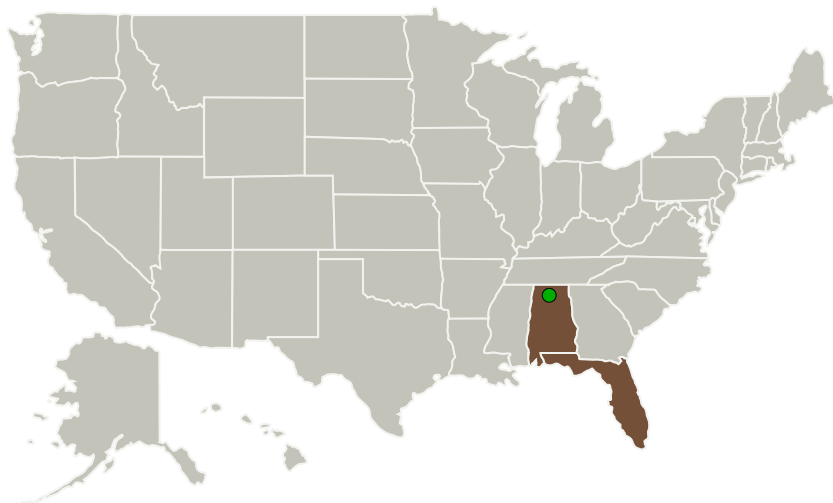
Completed Technology Project (2016 - 2018)



Project Introduction

Next-generation telescopes need mirrors that are extremely stable, lightweight, and affordable. Semplastics has developed a novel, innovative ceramic material which is lightweight, low-cost, and ideal for application as a mirror substrate. High-thickness, high-stiffness objects with excellent dimensional stability, low density, and low coefficient of thermal expansion can be manufactured in one piece through our energy-efficient process. Semplastics is proposing to extend prior research and manufacturing process development to produce larger-scale circular mirrors. This innovation will reduce mirror costs per square meter by an order of magnitude over current approaches based on glass or glass-ceramic solutions. As a part of the Phase II effort, Semplastics will deliver to NASA four large mirrors (up to 0.6m in diameter), sealed to address the residual surface porosity using one of two different coating systems, with ground and polished surfaces. At the end of Phase II, we will have matured and developed our production processes such that we are ready to establish the capability to produce mirrors of one meter diameter or larger.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Semplastics EHC, LLC	Lead Organization	Industry	Oviedo, Florida
● Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Florida

Project Transitions

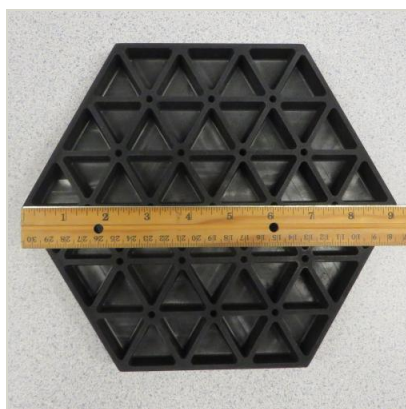
▶ **April 2016:** Project Start

✓ **September 2018:** Closed out

Closeout Documentation:

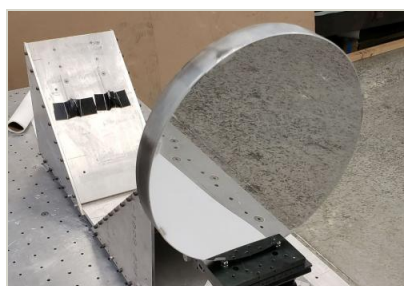
- Final Summary Chart(<https://techport.nasa.gov/file/140414>)

Images



Briefing Chart Image

Large-Scale Molded Silicon Oxycarbide Composite Components for Ultra-Low-Cost Lightweight Mirrors, Phase II
(<https://techport.nasa.gov/image/136961>)



Final Summary Chart Image

Large-Scale Molded Silicon Oxycarbide Composite Components for Ultra-Low-Cost Lightweight Mirrors, Phase II
(<https://techport.nasa.gov/image/135005>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Semplastics EHC, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

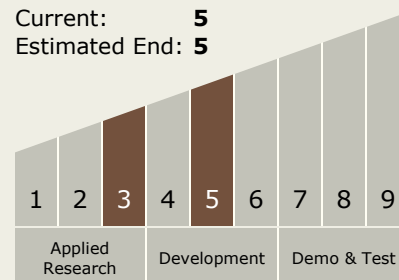
Carlos Torrez

Principal Investigator:

William Easter

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System